

WHAT IS CLAIMED IS:

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1. A communication method comprising the steps of:  
collectively transmitting from a first communication  
apparatus to a second communication apparatus a first operation  
request to be transmitted to the second communication apparatus  
10 and a second operation response to a second operation request  
received from the second communication apparatus, which first  
operation request and second operation response are combined in  
one batch; and

collectively transmitting from the second communication  
15 apparatus to the first communication apparatus the second  
operation request to be transmitted to the first communication  
apparatus and a first operation response to the first operation  
request received from the first communication apparatus, which  
second operation request and first operation response are  
20 combined in one batch.

25 2. The communication method as claimed in claim 1,

wherein:

the first operation request and the second operation request each correspond to a function call; and

the first operation response and the second operation response each correspond to an execution result of a function called by the function call.

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3. The communication method as claimed in claim 1,

wherein:

the second communication apparatus is arranged to transmit the second operation request and the first operation response as a communication request; and

the first communication apparatus is arranged to transmit the first operation request and the second operation response as a communication response to the communication request from the second communication apparatus.

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4. The communication method as claimed in claim 3,

wherein the second communication apparatus is arranged to

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periodically transmit the communication request to the first communication apparatus.

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5. A communication method comprising the steps of:  
collectively transmitting from a first communication apparatus to a second communication apparatus a first SOAP request to be transmitted to the second communication apparatus and a second SOAP response to a second SOAP request received from the second communication apparatus, which first SOAP request and second SOAP response are described in one message;  
and

15 collectively transmitting from the second communication apparatus to the first communication apparatus the second SOAP request to be transmitted to the first communication apparatus and a first SOAP response to the first SOAP request received from the first communication apparatus, which second SOAP  
20 request and first SOAP response are described in one message.

25 6. The communication method as claimed in claim 5,

wherein:

the first SOAP request and the second SOAP request each describe a function call; and

the first SOAP response and the second SOAP response each  
5 describe an execution result of a function called by the function call.

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7. The communication method as claimed in claim 5,

wherein:

the second communication apparatus is arranged to transmit  
to the first communication apparatus an HTTP request that  
15 describes the second SOAP request and the first SOAP response  
to be transmitted to the first communication apparatus; and

the first communication apparatus is arranged to transmit  
to the second communication apparatus an HTTP response to the  
HTTP request that describes the first SOAP request and the  
20 second SOAP response to be transmitted to the second  
communication apparatus.

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8. The communication method as claimed in claim 7, wherein the second communication apparatus is arranged to periodically transmit the HTTP request to the first communication apparatus.

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9. A communication apparatus that is adapted to  
10 communicate with another communication apparatus as a communication counterpart, said communication apparatus comprising:

transmitting means for collectively transmitting to the communication counterpart a first operation request to be  
15 transmitted to the communication counterpart and a second operation response to a second operation request from the communication counterpart, which first operation request and second operation response are combined in one batch;

receiving means for collectively receiving from the  
20 communication counterpart a first operation response to the first operation request transmitted to the communication counterpart and the second operation request from the communication counterpart, which first operation response and second operation request are combined in one batch; and  
25 means for executing an operation according to the second

operation request from the communication counterpart, and  
generating the second operation response to said second  
operation request as an execution result of said operation.

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10. The communication apparatus as claimed in claim 9,  
wherein:

10       the first operation request and the second operation  
request each correspond to a function call; and  
          the first operation response and the second operation  
response each correspond to an execution result of a function  
called by the function call.

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11. A communication apparatus that is adapted to  
20 communicate with another communication apparatus as a  
communication counterpart, said communication apparatus  
comprising:

          first storage means for storing a second operation request  
from the communication counterpart and a second operation  
25 response to said second operation request;

second storage means for storing a first operation request to the communication counterpart and a first operation response to said first operation request;

request generating means for generating the first  
5 operation request to the communication counterpart and storing the generated first operation request in the second storage means;

response generating means for reading from the first storage means the second operation request from the  
10 communication counterpart, executing an operation according to said second operation request, generating the second operation response to said second operation request as an execution result of said operation, and storing in the first storage means the generated second operation response in association  
15 with the read second operation request;

gathering means for reading from the first storage means the second operation response to the second operation request from the communication counterpart, and reading from the second storage means the first operation request to the communication  
20 counterpart;

transmitting means for collectively transmitting to the communication counterpart the second operation response and the first operation request read by the gathering means in one batch;

25 receiving means for collectively receiving from the

communication counterpart the first operation response to the first operation request transmitted to the communication counterpart and the second operation request from the communication counterpart in one batch; and

5        distributing means for storing in the first storage means the second operation request from the communication counterpart received by the receiving means, and storing in the second storage means the first operation response to the first operation request transmitted to the communication counterpart  
10    in association with the first operation request transmitted to the communication counterpart.

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12. The communication apparatus as claimed in claim 11,

wherein:

the transmitting means is arranged to transmit to the communication counterpart the first operation request and the  
20    second operation response as SOAP messages; and

the receiving means is arranged to receive from the communication counterpart the second operation request and the first operation response as SOAP messages.

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13. The communication apparatus as claimed in claim 11,  
further comprising:

5 means for assigning priority information to the second  
operation request stored in the first storage means and the  
first operation request stored in the second storage means;

wherein

10 the response generating means is arranged to successively  
read from the first storage means the second operation request  
from the communication counterpart, generate the second  
operation response to said second operation request, and store  
the generated second operation response in the first storage  
means according to the priority information; and

15 the gathering means is arranged to successively read from  
the first storage means the second operation response to the  
second operation request from the communication counterpart  
according to the priority information, and successively read  
from the second storage means the first operation request to  
20 the communication counterpart according to the priority  
information.

14. A communication apparatus that is adapted to communicate with another communication apparatus as a communication counterpart, said communication apparatus comprising:

5       transmitting means for collectively transmitting to the communication counterpart a first SOAP request to be transmitted to the communication counterpart and a second SOAP response to a second SOAP request from the communication counterpart, which first SOAP request and second SOAP response  
10   are described in one message;

      receiving means for collectively receiving from the communication counterpart a first SOAP response to the first SOAP request transmitted to the communication counterpart and the second SOAP request from the communication counterpart,  
15   which first SOAP response and second SOAP request are described in one message; and

      means for executing an operation being requested by the second SOAP request from the communication counterpart and generating the second SOAP response describing an execution  
20   result of said second SOAP request.

25       15. The communication apparatus as claimed in claim 14,

wherein:

the first SOAP request and the second SOAP request each describe a function call; and

5 the first SOAP response and the second SOAP response each describe an execution result of a function called by the function call.

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16. A communication apparatus that is adapted to communicate with another communication apparatus as a communication counterpart, said communication apparatus comprising:

15 first storage means for storing a second operation request from the communication counterpart and a second operation response to said second operation request;

second storage means for storing a first operation request to the communication counterpart and a first operation response  
20 to said first operation request;

request generating means for generating the first operation request to the communication counterpart and storing the generated first operation request in the second storage means;

25 response generating means for reading from the first

storage means the second operation request from the communication counterpart, executing an operation according to said second operation request, generating the second operation response to said second operation request as an execution  
5 result of said operation, and storing in the first storage means the generated second operation response in association with the read second operation request;

gathering means for reading from the first storage means the second operation response to the second operation request  
10 from the communication counterpart, and reading from the second storage means the first operation request to the communication counterpart;

transmitting means for collectively transmitting to the communication counterpart a second SOAP response describing a  
15 content of the second operation response read by the gathering means and a first SOAP request describing a content of the first operation request read by the gathering means, which second SOAP response and first SOAP request are described in one message;

20 receiving means for collectively receiving from the communication counterpart a first SOAP response describing the content of the first operation response to the first operation request transmitted to the communication counterpart and a second SOAP request describing the content of the second  
25 operation request that are described in one message; and

distributing means for storing in the first storage means the content of the second operation request from the communication counterpart described in the second SOAP request received by the receiving means, and storing in the second storage means the content of the first operation response to the first operation request transmitted to the communication counterpart described in the received first SOAP response in association with the first operation request transmitted to the communication counterpart.

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16. The communication apparatus as claimed in claim 15, further comprising:

means for assigning priority information to the second operation request stored in the first storage means and the first operation request stored in the second storage means; wherein

the response generating means is arranged to successively read from the first storage means the second operation request from the communication counterpart, generate the second operation response to said second operation request, and store the generated second operation response in the first storage means according to the priority information; and

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the gathering means is arranged to successively read from the first storage means the second operation response to the second operation request from the communication counterpart according to the priority information, and successively read  
5 from the second storage means the first operation request to the communication counterpart according to the priority information.

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17. A communication system for a plurality of communication apparatuses that are adapted to communicate with each other as communication counterparts, said communication  
15 system comprising for each communication apparatus:

transmitting means for collectively transmitting to the communication counterpart a first operation request to be transmitted to the communication counterpart and a second operation response to a second operation request from the  
20 communication counterpart, which first operation request and second operation response are combined in one batch;

receiving means for collectively receiving from the communication counterpart a first operation response to the first operation request transmitted to the communication  
25 counterpart and the second operation request from the

communication counterpart, which first operation response and second operation request are combined in one batch; and

means for executing an operation according to the second operation request from the communication counterpart, and  
5 generating the second operation response to said second operation request as an execution result of said operation.

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18. The communication system as claimed in claim 17,  
wherein:

the first operation request and the second operation request each correspond to a function call; and

15 the first operation response and the second operation response each correspond to an execution result of a function called by the function call.

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19. A communication system for a plurality of communication apparatuses that are adapted to communicate with each other as communication counterparts, said communication  
25 system comprising for each communication apparatus:

first storage means for storing a second operation request from the communication counterpart and a second operation response to said second operation request;

5 second storage means for storing a first operation request to the communication counterpart and a first operation response to said first operation request;

request generating means for generating the first operation request to the communication counterpart and storing the generated first operation request in the second storage  
10 means;

response generating means for reading from the first storage means the second operation request from the communication counterpart, executing an operation according to said second operation request, generating the second operation  
15 response to said second operation request as an execution result of said operation, and storing in the first storage means the generated second operation response in association with the read second operation request;

gathering means for reading from the first storage means  
20 the second operation response to the second operation request from the communication counterpart, and reading from the second storage means the first operation request to the communication counterpart;

transmitting means for collectively transmitting to the  
25 communication counterpart the second operation response and the



first operation request read by the gathering means in one batch;

receiving means for collectively receiving from the communication counterpart the first operation response to the first operation request transmitted to the communication counterpart and the second operation request from the communication counterpart in one batch; and

distributing means for storing in the first storage means the second operation request from the communication counterpart received by the receiving means, and storing in the second storage means the first operation response to the first operation request transmitted to the communication counterpart in association with the first operation request transmitted to the communication counterpart.

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20. The communication system as claimed in claim 19,

20 wherein:

the transmitting means is arranged to transmit to the communication counterpart the first operation request and the second operation response as SOAP messages; and

the receiving means is arranged to receive from the communication counterpart the second operation request and the

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first operation response as SOAP messages.

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21. The communication system as claimed in claim 19,  
further comprising for each communication apparatus:

means for assigning priority information to the second  
operation request stored in the first storage means and the  
10 first operation request stored in the second storage means;  
wherein

the response generating means of each communication  
apparatus is arranged to successively read from the first  
storage means the second operation request from the  
15 communication counterpart, generate the second operation  
response to said second operation request, and store the  
generated second operation response in the first storage means  
according to the priority information;

the gathering means of each communication apparatus is  
20 arranged to successively read from the first storage means the  
second operation response to the second operation request from  
the communication counterpart according to the priority  
information, and successively read from the second storage  
means the first operation request to the communication  
25 counterpart according to the priority information.

- 5           22. A communication apparatus control method for  
controlling a communication apparatus that is adapted to  
communicate with another communication apparatus as a  
communication counterpart, said method controlling the  
communication apparatus to execute:
- 10           a transmitting process of collectively transmitting to the  
communication counterpart a first operation request to be  
transmitted to the communication counterpart and a second  
operation response to a second operation request from the  
communication counterpart, which first operation request and  
15   second operation response are combined in one batch;  
            a receiving process of collectively receiving from the  
communication counterpart a first operation response to the  
first operation request transmitted to the communication  
counterpart and the second operation request from the  
20   communication counterpart, which first operation response and  
second operation request are combined in one batch; and  
            a process of executing an operation according to the  
second operation request from the communication counterpart,  
and generating the second operation response to said second  
25   operation request as an execution result of said operation.

5        23. The communication apparatus control method as claimed  
in claim 22, wherein:

the first operation request and the second operation  
request each correspond to a function call; and

10        the first operation response and the second operation  
response each correspond to an execution result of a function  
called by the function call.

15        24. A communication apparatus control method for  
controlling a communication apparatus that is adapted to  
communicate with another communication apparatus as a  
communication counterpart, said method controlling the  
20        communication apparatus to execute:

a process of implementing a first storage area for storing  
a second operation request from the communication counterpart  
and a second operation response to said second operation  
request;

25        a process of implementing a second storage area for

storing a first operation request to the communication counterpart and a first operation response to said first operation request;

5 a request generating process of generating the first operation request to the communication counterpart and storing the generated first operation request in the second storage area;

10 a response generating process of reading from the first storage area the second operation request from the communication counterpart, executing an operation according to said second operation request, generating the second operation response to said second operation request as an execution result of said operation, and storing in the first storage area the generated second operation response in association with the  
15 read second operation request;

gathering process of reading from the first storage area the second operation response to the second operation request from the communication counterpart, and reading from the second storage area the first operation request to the communication  
20 counterpart;

a transmitting process of collectively transmitting to the communication counterpart the second operation response and the first operation request read by the gathering means in one batch;

25 a receiving process of collectively receiving from the

communication counterpart the first operation response to the first operation request transmitted to the communication counterpart and the second operation request from the communication counterpart in one batch; and

- 5           a distributing process of storing in the first storage area the second operation request from the communication counterpart received in the receiving process, and storing in the second storage area the first operation response to the first operation request transmitted to the communication counterpart in association with the first operation request
- 10           transmitted to the communication counterpart.

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25. The communication apparatus control method as claimed in claim 24, wherein:

- in the transmitting process, the first operation request and the second operation response to be transmitted to the communication counterpart are transmitted as SOAP messages; and
- 20           in the receiving process, the second operation request and the first operation response to be received from the communication counterpart are transmitted as SOAP messages.

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26. The communication apparatus control method as claimed  
in claim 24, wherein:

5       the communication apparatus is further controlled to  
execute a process of assigning priority information to the  
second operation request stored in the first storage area and  
the first operation request stored in the second storage area;

10       in the response generating process, the second operation  
request from the communication counterpart is successively read  
from the first storage area to generate the second operation  
response to said second operation request and to store the  
generated second operation response in the first storage area  
according to the priority information;

15       in the gathering process, the second operation response to  
the second operation request from the communication counterpart  
is successively read from the first storage area according to  
the priority information, and the first operation request to  
the communication counterpart is successively read from the  
20   second storage area according to the priority information.

25       27. A medium storing programs for controlling a computer

to function as a communication apparatus that is adapted to communicate with another communication apparatus as a communication counterpart, said medium containing programs for the computer to function as:

5       transmitting means for collectively transmitting to the communication counterpart a first operation request to be transmitted to the communication counterpart and a second operation response to a second operation request from the communication counterpart, which first operation request and  
10       second operation response are combined in one batch;

          receiving means for collectively receiving from the communication counterpart a first operation response to the first operation request transmitted to the communication counterpart and the second operation request from the  
15       communication counterpart, which first operation response and second operation request are combined in one batch; and

          means for executing an operation according to the second operation request from the communication counterpart, and generating the second operation response to said second  
20       operation request as an execution result of said operation.

25       28. The medium implementing the programs as claimed in



claim 27, wherein:

the first operation request and the second operation request each correspond to a function call; and

the first operation response and the second operation response each correspond to an execution result of a function called by the function call.

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29. A medium storing a program for controlling a computer to function as a communication apparatus that is adapted to communicate with another communication apparatus as a communication counterpart, said medium containing programs for the computer to function as:

first storage means for storing a second operation request from the communication counterpart and a second operation response to said second operation request;

second storage means for storing a first operation request to the communication counterpart and a first operation response to said first operation request;

request generating means for generating the first operation request to the communication counterpart and storing the generated first operation request in the second storage means;

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first operation request stored in the second storage means;

wherein

the response generating means is arranged to successively  
read from the first storage means the second operation request  
5 from the communication counterpart, generate the second  
operation response to said second operation request, and store  
the generated second operation response in the first storage  
means according to the priority information; and

the gathering means is arranged to successively read from  
10 the first storage means the second operation response to the  
second operation request from the communication counterpart  
according to the priority information, and successively read  
from the second storage means the first operation request to  
the communication counterpart according to the priority  
15 information.

20 32. A communication client that is adapted to transmit a  
communication request to a communication server, and receive a  
communication response to said communication request from the  
communication server, wherein the communication request  
describes a client request corresponding to a client operation  
25 request to the communication server, and the communication

response describes a client operation response to the client request, said communication client comprising:

transmitting means for collectively transmitting to the communication server the client request and a server operation response to a server request corresponding to a server operation request from the communication server that are described together in the communication request;

receiving means for collectively receiving from the communication server the client operation response to the client request transmitted to the communication server and the server request that are described together in the communication response to the communication request; and

means for executing an operation according to the server request and generating the server operation response to the server request as an execution result of said operation.

33. The communication client as claimed in claim 32, wherein:

the client operation request and the server operation request each correspond to a function call; and

the client operation response and the client operation response each correspond to an execution result of a function

response to said server request as an execution result of said operation, and storing in the first storage means the generated server operation response in association with the read server request;

5       gathering means for reading the server operation response to the server request from the first storage means, and reading the client request from the second storage means;

transmitting means for collectively transmitting to the communication server the read server operation response and  
10 client request that are described together in the communication request;

receiving means for collectively receiving from the communication server the client operation response to the client request transmitted to the communication server and the  
15 server request that are described together in the communication response to the communication request; and

distributing means for storing in the first storage means the server request received by the receiving means, and storing in the second storage means the received client operation  
20 response to the client request transmitted to the communication server in association with the client request transmitted to the communication server.

35. The communication client as claimed in claim 34,  
wherein the transmitting means is arranged to periodically  
transmit the communication request to the communication server.

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36. The communication client as claimed in claim 34,  
10 wherein:

the transmitting means is arranged to transmit to the  
communication server the client operation request and the  
server operation response as SOAP messages; and

the receiving means is arranged to receive from the  
15 communication server the server operation request and the  
client operation response as SOAP messages.

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37. The communication client as claimed in claim 34,  
further comprising:

means for assigning priority information to the server  
request stored in the first storage means and the client  
25 request stored in the second storage means; wherein

the response generating means is arranged to successively read the server request from the first storage means, generate the server operation response to said server request, and store the generated server operation response in the first storage  
5 means according to the priority information; and

the gathering means is arranged to successively read the server operation response to the server request from the first storage means according to the priority information, and successively read the client request from the second storage  
10 means according to the priority information.

15 38. A communication client that is adapted to transmit an HTTP request to a communication server, and receive an HTTP response to said HTTP request from the communication server, wherein the HTTP request describes a client SOAP request to the communication server, and the HTTP response describes a client  
20 SOAP response to the client SOAP request, said communication client comprising:

transmitting means for collectively transmitting to the communication server the client SOAP request and a server SOAP response to a server SOAP request from the communication server  
25 that are described together in the HTTP request;

receiving means for collectively receiving from the communication server the client SOAP response to the client SOAP request transmitted to the communication server and the server SOAP request from the communication server that are  
5 described together in the HTTP response; and

means for executing an operation according to the server SOAP request received from the communication server and generating an execution result of said operation that is to be described in the server SOAP response to said server SOAP  
10 request.

15 39. The communication client as claimed in claim 38,  
wherein:

the client SOAP request and the server SOAP request each describe a function call; and

the client SOAP response and the server SOAP response each  
20 describe an execution result of a function called by the  
function call.

40. A communication client that is adapted to transmit an HTTP request to a communication server, and receive an HTTP response to said HTTP request from the communication server, wherein the HTTP request describes a client SOAP request to the communication server, and the HTTP response describes a client SOAP response to the client SOAP request, said communication client comprising:

first storage means for storing a server request corresponding to an server operation request from the communication server and a server operation response to said server request;

second storage means for storing a client request corresponding to a client operation request to the communication server and a client operation response to said client request;

request generating means for generating the client request and storing the generated client request in the second storage means;

response generating means for reading the server request from the first storage means, executing an operation according to said server request, generating the server operation response to said server request as an execution result of said operation, and storing in the first storage means the generated server operation response in association with the read server request;



gathering means for reading the server operation response to the server request from the first storage means, and reading the client request from the second storage means;

transmitting means for collectively transmitting to the communication server the server SOAP response describing a content of the server operation response read by the gathering means and the client SOAP request describing a content of the client request read by the gathering means that are described together in the HTTP request;

receiving means for collectively receiving from the communication server the client SOAP response to the client SOAP request transmitted to the communication server and the server SOAP request from the communication server that are described together in the HTTP response to the HTTP request;

and

distributing means for storing in the first storage means the content of the server request described in the server SOAP request received by the receiving means, and storing in the second storage means the content of the client operation response to the client request transmitted to the communication server, which client operation response is described in the client SOAP response received by the receiving means, in association with the client request transmitted to the communication server.

41. The communication client as claimed in claim 40,  
5 wherein the transmitting means is arranged to periodically  
transmit the HTTP request to the communication server.

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42. The communication client as claimed in claim 40,  
further comprising:

means for assigning priority information to the server  
request stored in the first storage means and the client  
15 request stored in the second storage means; wherein

the response generating means is arranged to successively  
read the server request from the first storage means, generate  
the server operation response to said server request, and store  
the generated server operation response in the first storage  
20 means according to the priority information; and

the gathering means is arranged to successively read the  
server operation response to the server request from the first  
storage means according to the priority information, and  
successively read the client request from the second storage  
25 means according to the priority information.

response generating means for reading from the first  
storage means the second operation request from the  
communication counterpart, executing an operation according to  
said second operation request, generating the second operation  
5 response to said second operation request as an execution  
result of said operation, and storing in the first storage  
means the generated second operation response in association  
with the read second operation request;

gathering means for reading from the first storage means  
10 the second operation response to the second operation request  
from the communication counterpart, and reading from the second  
storage means the first operation request to the communication  
counterpart;

transmitting means for collectively transmitting to the  
15 communication counterpart the second operation response and the  
first operation request read by the gathering means in one  
batch;

receiving means for collectively receiving from the  
communication counterpart the first operation response to the  
20 first operation request transmitted to the communication  
counterpart and the second operation request from the  
communication counterpart in one batch; and

distributing means for storing in the first storage means  
the second operation request from the communication counterpart  
25 received by the receiving means, and storing in the second

storage means the first operation response to the first operation request transmitted to the communication counterpart in association with the first operation request transmitted to the communication counterpart.

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30. The medium storing the program as claimed in claim 29,  
10 wherein:

the transmitting means is arranged to transmit to the communication counterpart the first operation request and the second operation response as SOAP messages; and

the receiving means is arranged to receive from the  
15 communication counterpart the second operation request and the first operation response as SOAP messages.

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31. The medium storing the programs as claimed in claim 29, further containing a program for the computer to function as:

means for assigning priority information to the second  
25 operation request stored in the first storage means and the

called by the function call.

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34. A communication client that is adapted to transmit a communication request to a communication server, and receive a communication response to said communication request from the communication server, wherein the communication request  
10 describes a client request corresponding to a client operation request to the communication server, and the communication response describes a client operation response to the client request, said communication client comprising:

first storage means for storing a server request  
15 corresponding to a sever operation request from the communication server and a server operation response to said server request;

second storage means for storing the client request and a client operation response to said client request;

20 request generating means for generating the client request and storing the generated client request in the second storage means;

response generating means for reading the server request from the first storage means, executing an operation according  
25 to said server request, generating the server operation

5           43. A communication client control method for controlling  
a communication client that is adapted to transmit a  
communication request to a communication server, and receive a  
communication response to said communication request from the  
communication server, wherein the communication request  
10 describes a client request corresponding to an operation  
request to the communication server, and the communication  
response describes an operation response to the client request,  
said method controlling the communication client to execute:  
a transmitting process of collectively transmitting to the  
15 communication server the client request and an operation  
response to a server request corresponding to an operation  
request from the communication server that are described  
together in the communication request;  
a receiving process of collectively receiving from the  
20 communication server the operation response to the client  
request transmitted to the communication server and the server  
request that are described together in the communication  
response to the communication request; and  
a process of executing an operation according to the  
25 server request and generating the operation response to the

server request as an execution result of said operation.

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44. The communication client control method as claimed in claim 43, wherein

the operation request corresponds to a function call; and

the operation response corresponds to an execution result

10 of a function called by the function call.

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45. A communication client control method for controlling a communication client that is adapted to transmit a communication request to a communication server, and receive a communication response to said communication request from the communication server, wherein the communication request

20 describes a client request corresponding to an operation request to the communication server, and the communication response describes an operation response to the client request, said method controlling the communication client to execute:

a process of implementing a first storage area for storing

25 a server request corresponding to an operation request from the

communication server and an operation response to said server request;

a process of implementing a second storage area for storing the client request and an operation response to said  
5 client request;

a request generating process of generating the client request and storing the generated request in the second storage area;

a response generating process of reading the server  
10 request from the first storage area, executing an operation according to said server request, generating the operation response to said server request as an execution result of said operation, and storing in the first storage area the generated operation response in association with the read server request;

15 a gathering process of reading the operation response to the server request from the first storage area, and reading the client request from the second storage area;

a transmitting process of collectively transmitting to the communication server the read operation response and client  
20 request that are described together in the communication request;

a receiving process of collectively receiving from the communication server the operation response to the client request transmitted to the communication server and the server  
25 request that are described together in the communication



response to the communication request; and

a distributing process of storing in the first storage area the server request received in the receiving process, and storing in the second storage area the received operation

5 response to the client request transmitted to the communication server in association with the client request transmitted to the communication server.

10

46. The communication client control method as claimed in claim 45, wherein the communication client is controlled to periodically transmit the communication request to the

15 communication server.

20 47. The communication client control method as claimed in claim 45, wherein:

in the transmitting process, the operation request and the operation response are transmitted to the communication server as respective SOAP messages; and

25 in the receiving process, the operation request and the

operation response are received from the communication server  
as respective SOAP messages.

5

48. The communication client control method as claimed in  
claim 45, further controlling the communication client to  
execute:

10 a process of assigning priority information to the server  
request stored in the first storage area and the client request  
stored in the second storage area; wherein

in the response generating process, the server request is  
successively read from the first storage area to generate the  
15 operation response to said server request and store the  
generated operation response in the first storage area  
according to the priority information; and

in the gathering process, the operation response to the  
server request is successively read from the first storage area  
20 according to the priority information, and the client request  
is successively read from the second storage area according to  
the priority information.

25

49. A medium storing programs for controlling a computer to function as a communication client that is adapted to transmit a communication request to a communication server, and  
5 receive a communication response to said communication request from the communication server, wherein the communication request describes a client request corresponding to an operation request to the communication server, and the communication response describes an operation response to the  
10 client request, said medium containing programs for the computer to function as:

transmitting means for collectively transmitting to the communication server the client request and an operation response to a server request corresponding to an operation  
15 request from the communication server that are described together in the communication request;

receiving means for collectively receiving from the communication server the operation response to the client request transmitted to the communication server and the server  
20 request that are described together in the communication response to the communication request; and

means for executing an operation according to the server request and generating the operation response to the server request as an execution result of said operation.

50. The medium storing the programs as claimed in claim  
5 49, wherein:  
the operation request corresponds to a function call; and  
the operation response corresponds to an execution result  
of a function called by the function call.

10

51. A medium storing programs for controlling a computer  
to function as a communication client that is adapted to  
15 transmit a communication request to a communication server, and  
receive a communication response to said communication request  
from the communication server, wherein the communication  
request describes a client request corresponding to an  
operation request to the communication server, and the  
20 communication response describes an operation response to the  
client request, said medium containing programs for the  
computer to function as:

first storage means for storing a server request  
corresponding to an operation request from the communication  
25 server and an operation response to said server request;

second storage means for storing the client request and an operation response to said client request;

request generating means for generating the client request and storing the generated client request in the second storage

5 means;

response generating means for reading the server request from the first storage means, executing an operation according to said server request, generating the operation response to said server request as an execution result of said operation, and storing in the first storage means the generated operation response in association with the read server request;

gathering means for reading the operation response to the server request from the first storage means, and reading the client request from the second storage means;

15 transmitting means for collectively transmitting to the communication server the read operation response and client request that are described together in the communication request;

receiving means for collectively receiving from the communication server the operation response to the client request transmitted to the communication server and the server request that are described together in the communication response to the communication request; and

distributing means for storing in the first storage means the server request received by the receiving means, and storing

25

in the second storage means the received operation response to the client request transmitted to the communication server in association with the client request transmitted to the communication server.

5

52. The medium storing the programs as claimed in claim 10 51, wherein the transmitting means is arranged to periodically transmit the communication request to the communication server.

15

53. The medium storing the programs as claimed in claim 51, wherein:

the transmitting means is arranged to transmit to the communication server the operation request and the operation 20 response as respective SOAP messages; and

the receiving means is arranged to receive from the communication server the operation request and the operation response as respective SOAP messages.

25

54. The medium storing the programs as claimed in claim  
51, further containing a program for controlling the computer  
5 to function as:

means for assigning priority information to the server  
request stored in the first storage means and the client  
request stored in the second storage means; wherein

the response generating means is arranged to successively  
10 read the server request from the first storage means, generate  
the operation response to said server request, and store the  
generated operation response in the first storage means  
according to the priority information; and

the gathering means is arranged to successively read the  
15 operation response to the server request from the first storage  
means according to the priority information, and successively  
read the client request from the second storage means according  
to the priority information.

20

55. A communication server that is adapted to receive a  
communication request from a communication client, and transmit  
25 a communication response to said communication request to the

communication client, wherein the communication request describes a client request corresponding to an operation request from the communication client, and the communication response describes an operation response to the client request,

5 said communication server comprising:

receiving means for collectively receiving from the communication client the client request and an operation response to a server request corresponding to an operation request transmitted to the communication client that are

10 described together in the communication request;

transmitting means for collectively transmitting to the communication client the operation response to the client request received from the communication client and the server request that are described together in the communication

15 response to the communication request; and

means for executing an operation according to the client request and generating the operation response to the client request as an execution result of said operation.

20

56. The communication server as claimed in claim 55,

wherein:

25 the operation request corresponds to a function call; and



the operation response corresponds to an execution result of a function called by the function call.

5

57. A communication server that is adapted to receive a communication request from a communication client, and transmit a communication response to said communication request to the communication client, wherein the communication request describes a client request corresponding to an operation request from the communication client, and the communication response describes an operation response to the client request, said communication server comprising:

15 first storage means for storing the client request and an operation response to said client request;

second storage means for storing a server request corresponding to an operation request to the communication client and an operation response to said server request;

20 request generating means for generating the server request and storing the generated server request in the second storage means;

response generating means for reading the client request from the first storage means, executing an operation according to said client request, generating the operation response to

25

said client request as an execution result of said operation,  
and storing in the first storage means the generated operation  
response in association with the read client request;

receiving means for collectively receiving from the  
5 communication client the client request and the operation  
response to the server request transmitted to the communication  
client that are described together in the communication  
request;

distributing means for storing in the first storage means  
10 the client request received by the receiving means, and storing  
in the second storage means the received operation response to  
the server request transmitted to the communication client in  
association with the server request transmitted to the  
communication client;

15 gathering means for reading the operation response to the  
client request from the first storage means, and reading the  
server request from the second storage means; and

transmitting means for collectively transmitting to the  
communication client the read operation response and server  
20 request that are described together in the communication  
response.

58. The communication server as claimed in claim 57,  
wherein:

the receiving means is arranged to receive the operation  
response and the operation request from the communication  
5 client as respective SOAP messages; and

the transmitting means is arranged to transmit the  
operation response and the operation request to the  
communication client as respective SOAP messages.

10

59. The communication server as claimed in claim 57,  
further comprising:

15 means for assigning priority information to the client  
request stored in the first storage means and the server  
request stored in the second storage means; wherein

the response generating means is arranged to successively  
read the client request from the first storage means, generate  
20 the operation response to said client request, and store the  
generated operation response in the first storage means  
according to the priority information; and

the gathering means is arranged to successively read the  
operation response to the client request from the first storage  
25 means according to the priority information, and successively

read the server request from the second storage means according to the priority information.

5

60. A communication server that is adapted to receive an HTTP request from a communication client, and transmit an HTTP response to said communication request to the communication client, wherein the HTTP request describes a SOAP request from the communication client, and the HTTP response describes a SOAP response to said SOAP request, said communication server comprising:

receiving means for collectively receiving from the communication client the SOAP request and a SOAP response to a SOAP request transmitted to the communication client that are described together in the HTTP request;

transmitting means for collectively transmitting to the communication client the SOAP response to the SOAP request from the communication client and the SOAP request to the communication client that are described together in the HTTP response to the HTTP request; and

means for executing an operation according to the SOAP request received from the communication client and generating an execution result of said operation that is to be described

in the SOAP response to said SOAP request.

5

61. The communication server as claimed in claim 60,  
wherein:

the SOAP request describes a function call; and

the SOAP response describes an execution result of a

10 function called by the function call.

15

62. A communication server that is adapted to receive an  
HTTP request from a communication client, and transmit an HTTP  
response to said communication request to the communication  
client, wherein the HTTP request describes a SOAP request from  
the communication client, and the HTTP response describes a  
20 SOAP response to said SOAP request, said communication server  
comprising:

first storage means for storing a client request  
corresponding to an operation request from the communication  
client and an operation response to said client command;

25

second storage means for storing a server request

corresponding to an operation request to the communication client and an operation response to said server request;

request generating means for generating the server request and storing the generated server request in the second storage

5 means;

response generating means for reading the client request from the first storage means; executing an operation according to said client request, generating the operation response to said client request as an execution result of said operation,

10 and storing in the first storage means the generated operation response in association with the read client request;

receiving means for collectively receiving from the communication client the SOAP request describing the client request and the SOAP response, corresponding to a response to the SOAP request transmitted to the communication client and describing the operation response to the server request transmitted to the communication client, that are described together in the HTTP request;

15 distributing means for storing in the first storage means a content of the client request described in the SOAP request received by the receiving means and storing in the second storage means a content of the operation response described in the SOAP response received by the receiving means in association with the server request transmitted to the communication client;

25

gathering means for reading the operation response to the client request from the first storage means, and reading the server request from the second storage means; and

transmitting means for collectively transmitting to the communication client the SOAP response describing the content of the operation response read by the gathering means and the SOAP request describing the content of the operation request read by the gathering means that are described together in the HTTP response to the HTTP request.

10

63. The communication server as claimed in claim 62, further comprising:

means for assigning priority information to the client request stored in the first storage means and the server request stored in the second storage means; wherein

the response generating means is arranged to successively read the client request from the first storage means, generate the operation response to said client request, and store the generated operation response in the first storage means according to the priority information; and

the gathering means is arranged to successively read the operation response to the client request from the first storag

25

means according to the priority information, and successively read the server request from the second storage means according to the priority information.

5

64. A communication server control method for controlling a communication server that is adapted to receive a  
10 communication request from a communication client, and transmit a communication response to said communication request to the communication client, wherein the communication request describes a client request corresponding to an operation request from the communication client, and the communication  
15 response describes an operation response to said client request, said method controlling the communication server to execute:

a receiving process of collectively receiving from the communication client the client request and an operation response to a server request corresponding to an operation  
20 request transmitted to the communication client that are described together in the communication request;

a transmitting process of collectively transmitting to the communication client the operation response to the client request received from the communication client and the server  
25 request that are described together in the communication



response to the communication request; and

a process of executing an operation according to the client request, and generating the operation response to the client request as an execution result of said operation.

5

65. The communication server controlling method as

10 claimed in claim 64, wherein:

the operation request corresponds to a function call; and

the operation response corresponds to an execution result of a function called by the function call.

15

66. A communication server control method for controlling a communication server that is adapted to receive a

20 communication request from a communication client, and transmit

a communication response to said communication request to the

communication client, wherein the communication request

describes a client request corresponding to an operation

request from the communication client, and the communication

25 response describes an operation response to said client request,

said method controlling the communication server to execute:

a process of implementing a first storage area for storing the client request and an operation response to said client request;

5 a process of implementing a second storage area for storing a server request corresponding to an operation request to the communication client and an operation response to said server request;

a request generating process of generating the server request and storing the generated server request in the second storage area;

a response generating process of reading the client request from the first storage area, executing an operation according to said client request, generating the operation response to said client request as an execution result of said operation, and storing in the first storage area the generated operation response in association with the read client request;

15 a receiving process of collectively receiving from the communication client the client request and the operation response to the server request transmitted to the communication client that are described together in the communication request;

a distributing process of storing in the first storage area the client request received in the receiving process, and  
25 storing in the second storage area the received operation

response to the server request transmitted to the communication client in association with the server request transmitted to the communication client;

5 a gathering process of reading the operation response to the client request from the first storage area, and reading the server request from the second storage area; and

a transmitting process of collectively transmitting to the communication client the read operation response and server request that are described together in the communication  
10 response.

15 67. The communication server controlling method as claimed in claim 66, wherein:

in the receiving process, the operation response and the operation request are received from the communication client as respective SOAP messages; and

20 in the transmitting process, the operation response and the operation request are transmitted to the communication client as respective SOAP messages.

68. The communication server controlling method as claimed in claim 66, further controlling the communication server to execute:

5       a process of assigning priority information to the client request stored in the first storage area and the server request stored in the second storage area; wherein

          in the response generating process, the client request is successively read from the first storage area to generate the operation response to said client request and store the  
10       generated operation response in the first storage area according to the priority information; and

          in the gathering process the operation response to the client request is successively read from the first storage  
15       means according to the priority information, and the server request is successively read from the second storage means according to the priority information.

20

69. A medium storing programs for controlling a computer to function as a communication server that is adapted to receive a communication request from a communication client,  
25       and transmit a communication response to said communication

request to the communication client, wherein the communication request describes a client request corresponding to an operation request from the communication client, and the communication response describes an operation response to the client request, said medium containing programs for the computer to function as:

receiving means for collectively receiving from the communication client the client request and an operation response to a server request corresponding to an operation request transmitted to the communication client that are described together in the communication request;

transmitting means for collectively transmitting to the communication client the operation response to the client request received from the communication client and the server request that are described together in the communication response to the communication request; and

means for executing an operation according to the client request and generating the operation response to the client request as an execution result of said operation.

20

70. The medium storing the programs as claimed in claim 69, wherein:

25

the operation request corresponds to a function call; and  
the operation response corresponds to an execution result  
of a function called by the function call.

5

71. A medium storing programs for controlling a computer  
to function as a communication server that is adapted to  
10 receive a communication request from a communication client,  
and transmit a communication response to said communication  
request to the communication client, wherein the communication  
request describes a client request corresponding to an  
operation request from the communication client, and the  
15 communication response describes an operation response to the  
client request, said medium containing programs for the  
computer to function as:

first storage means for storing the client request and an  
operation response to said client request;

20 second storage means for storing a server request  
corresponding to an operation request to the communication  
client and an operation response to said server request;

request generating means for generating the server request  
and storing the generated server request in the second storage  
25 means;

response generating means for reading the client request from the first storage means, executing an operation according to said client request, generating the operation response to said client request as an execution result of said operation, and storing in the first storage means the generated operation response in association with the read client request;

receiving means for collectively receiving from the communication client the client request and the operation response to the server request transmitted to the communication client that are described together in the communication request;

distributing means for storing in the first storage means the client request received by the receiving means, and storing in the second storage means the received operation response to the server request transmitted to the communication client in association with the server request transmitted to the communication client;

gathering means for reading the operation response to the client request from the first storage means, and reading the server request from the second storage means; and

transmitting means for collectively transmitting to the communication client the read operation response and server request that are described together in the communication response.

72. The medium storing the programs as claimed in claim  
5 71, wherein:

the receiving means is arranged to receive the operation  
response and the operation request from the communication  
client as respective SOAP messages; and

the transmitting means is arranged to transmit the  
10 operation response and the operation request to the  
communication client as respective SOAP messages.

15

73. The medium storing the programs as claimed in claim  
71, further containing a program for controlling the computer  
to function as:

means for assigning priority information to the client  
20 request stored in the first storage means and the server  
request stored in the second storage means; wherein

the response generating means is arranged to successively  
read the client request from the first storage means, generate  
the operation response to said client request, and store the  
25 generated operation response in the first storage means



according to the priority information; and

the gathering means is arranged to successively read the operation response to the client request from the first storage means according to the priority information, and successively  
5 read the server request from the second storage means according to the priority information.

10

74. A communication system for a communication client and a communication server, wherein the communication client transmits a communication request to the communication server and receives a communication response to said communication  
15 request from the communication server, said communication request describing a client request corresponding to a client operation request to the communication server, said communication response describing a client operation response to said client request, the communication system comprising:  
20 client transmitting means for collectively transmitting to the communication server the client request and a server operation response to a server request corresponding to a server operation request from the communication server that are described together in the communication request;  
25 client receiving means for collectively receiving from the

communication server the client operation response to the client request transmitted to the communication server and the server request that are described together in the communication response to the communication request; and

5        client executing means for executing an operation according to the server request and generating the server operation response to the server request as an execution result of said operation;

server receiving means for collectively receiving from the  
10 communication client the client request and the server operation response to the server request transmitted to the communication client that are described together in the communication request;

server transmitting means for collectively transmitting to  
15 the communication client the client operation response to the client request received from the communication client and the server request that are described together in the communication response to the communication request; and

server executing means for executing an operation  
20 according to the client request and generating the client operation response to the client request as an execution result of said operation.

75. The communication system as claimed in claim 74,  
wherein:

the client operation request and the server operation  
5 request each correspond to a function call; and

the client operation response and the server operation  
response each correspond to an execution result of a function  
called by the function call.

10

76. A communication system for a communication client and  
a communication server, wherein the communication client  
15 transmits a communication request to the communication server  
and receives a communication response to said communication  
request from the communication server, said communication  
request describing a client request corresponding to a client  
operation request to the communication server, said  
20 communication response describing a client operation response  
to said client request, said communication system comprising:

client first storage means for storing a server request  
corresponding to a server operation request from the  
communication server and a server operation response to said  
25 server request;

client second storage means for storing the client request and the client operation response to said client request;

client request generating means for generating the client request and storing the generated client request in the second  
5 storage means;

client response generating means for reading the server request from the first storage means, executing an operation according to said server request, generating the sever operation response to said server request as an execution  
10 result of said operation, and storing in the client first storage means the generated server operation response in association with the read server request;

client gathering means for reading the server operation response to the server request from the client first storage  
15 means, and reading the client request from the client second storage means;

client transmitting means for collectively transmitting to the communication server the read server operation response and client request that are described together in the communication  
20 request;

client receiving means for collectively receiving from the communication server the client operation response to the client request transmitted to the communication server and the server request that are described together in the communication  
25 response to the communication request; and

client distributing means for storing in the client first storage means the server request received by the receiving means, and storing in the client second storage means the received client operation response to the client request

5 transmitted to the communication server in association with the client request transmitted to the communication server;

server first storage means for storing the client request and the client operation response to said client request;

server second storage means for storing the server request  
10 and the server operation response to said server request;

server request generating means for generating the server request and storing the generated server request in the server second storage means;

server response generating means for reading the client  
15 request from the server first storage means, executing an operation according to said client request, generating the client operation response to said client request as an execution result of said operation, and storing in the server first storage means the generated client operation response in  
20 association with the read client request;

server receiving means for collectively receiving from the communication client the client request and the server operation response to the server request transmitted to the communication client that are described together in the  
25 communication request;

server distributing means for storing in the server first storage means the client request received by the receiving means, and storing in the server second storage means the received server operation response to the server request

5 transmitted to the communication client in association with the server request transmitted to the communication client;

server gathering means for reading the client operation response to the client request from the server first storage means, and reading the server request from the server second

10 storage means; and

transmitting means for collectively transmitting to the communication client the read client operation response and server request that are described together in the communication response to the communication request received by the server

15 receiving means.

20 77. The communication system as claimed in claim 76, wherein the client transmitting means is arranged to periodically transmit the communication request to the communication server.

78. The communication system as claimed in claim 76,  
wherein:

5       the client transmitting means is arranged to transmit the  
client operation request and the server operation response to  
the communication server as SOAP messages; and

          the client receiving means is arranged to receive the  
server operation request and the client operation response from  
10   the communication server as SOAP messages;

          the server receiving means is arranged to receive the  
server operation response and the client operation request from  
the communication client as SOAP messages; and

          the server transmitting means is arranged to transmit the  
15   client operation response and the server operation request to  
the communication client as SOAP messages.

20

79. The communication system as claimed in claim 76,  
further comprising:

          client prioritizing means for assigning priority  
information to the server request stored in the first storage  
25   means and the client request stored in the second storage

means; wherein

the client response generating means is arranged to successively read the server request from the first storage means, generate the server operation response to said server request, and store the generated server operation response in the client first storage means according to the priority information;

the client gathering means is arranged to successively read the server operation response to the server request from the client first storage means according to the priority information, and successively read the client request from the client second storage means according to the priority information;

said communication system further comprising:

server prioritizing means for assigning priority information to the client request stored in the server first storage means and the server request stored in the server second storage means; wherein

the server response generating means is arranged to successively read the client request from the first storage means, generate the client operation response to said client request, and store the generated client operation response in the server first storage means according to the priority information; and

the server gathering means is arranged to successively



read the client operation response to the client request from  
the server first storage means according to the priority  
information, and successively read the server request from the  
server second storage means according to the priority  
5 information.

10 80. A communication system for a communication client and  
a communication server, wherein the communication client  
transmits an HTTP request to the communication server and  
receives an HTTP response to the HTTP request from the  
communication server, said HTTP request describing a client  
15 SOAP request to the communication server, said HTTP response  
describing a client SOAP response to said client SOAP request,  
said communication system comprising:

client transmitting means for collectively transmitting to  
the communication server the client SOAP request to the  
20 communication server and a server SOAP response to a server  
SOAP request from the communication server that are described  
together in the HTTP request;

client receiving means for collectively receiving from the  
communication server the client SOAP response to the client  
25 SOAP request transmitted to the communication server and the

server SOAP request from the communication server that are described together in the HTTP response to the HTTP request; and

client executing means for executing an operation  
5 according to the server SOAP request received from the communication server and generating an execution result of said operation that is to be described in the server SOAP response to said server SOAP request;

server receiving means for collectively receiving from the  
10 communication client the client SOAP request from the communication client and the server SOAP response to the server SOAP request transmitted to the communication client that are described together in the HTTP request;

server transmitting means for collectively transmitting to  
15 the communication client the client SOAP response to the client SOAP request from the communication client and the server SOAP request to the communication client that are described together in the HTTP response to the HTTP request; and

server executing means for executing an operation  
20 according to the client SOAP request received from the communication client and generating an execution result of said operation that is to be described in the client SOAP response to said client SOAP request.

81. The communication system as claimed in claim 80,  
wherein:

5 the client SOAP request and the server SOAP request each  
describe a function call; and

the client SOAP response and the server SOAP response each  
describe an execution result of a function called by the  
function call.

10

82. A communication system for a communication client and  
15 a communication server, wherein the communication client  
transmits an HTTP request to the communication server and  
receives an HTTP response to the HTTP request from the  
communication server, said HTTP request describing a client  
SOAP request to the communication server, said HTTP response  
20 describing a client SOAP response to said client SOAP request,  
said communication system comprising:

client first storage means for storing a server request  
corresponding to a server operation request from the  
communication server and an server operation response to said  
25 server request;

client second storage means for storing a client request corresponding to a client operation request to the communication server and a client operation response to said client request;

5        client request generating means for generating the client request and storing the generated client request in the client second storage means;

client response generating means for reading the server request from the client first storage means, executing an  
10 operation according to said server request, generating the server operation response to said server request as an execution result of said operation, and storing in the client first storage means the generated server operation response in association with the read server request;

15        client gathering means for reading the server operation response to the server request from the client first storage means, and reading the client request from the client second storage means;

client transmitting means for collectively transmitting to  
20 the communication server the server SOAP response describing a content of the server operation response read by the client gathering means and the client SOAP request describing a content of the client request read by the client gathering means that are described together in the HTTP request;

25        client receiving means for collectively receiving from the

communication server the client SOAP response to the client  
SOAP request transmitted to the communication server and the  
server SOAP request from the communication server that are  
described together in the HTTP response to the HTTP request;

5 and

client distributing means for storing in the client first  
storage means the content of the server request described in  
the server SOAP request received by the client receiving means,  
and storing in the client second storage means the content of  
10 the client operation response to the client request transmitted  
to the communication server, which client operation response is  
described in the client SOAP response received by the client  
receiving means, in association with the client request  
transmitted to the communication server;

15 server first storage means for storing the client request  
and the client operation response to said client command;

server second storage means for storing the server request  
and the server operation response to said server request;

server request generating means for generating the server  
20 request and storing the generated server request in the server  
second storage means;

server response generating means for reading the client  
request from the server first storage means, executing an  
operation according to said client request, generating the  
25 client operation response to said client request as an

execution result of said operation, and storing in the server first storage means the generated client operation response in association with the read client request;

server receiving means for collectively receiving from the communication client the client SOAP request describing the client request and the server SOAP response to the server SOAP request describing the server operation response to the server request transmitted to the communication client, that are described together in the HTTP request;

server distributing means for storing in the server first storage means a content of the client request described in the client SOAP request received by the server receiving means and storing in the server second storage means a content of the server operation response described in the server SOAP response received by the server receiving means in association with the server request transmitted to the communication client;

server gathering means for reading the client operation response to the client request from the server first storage means, and reading the server request from the server second storage means; and

server transmitting means for collectively transmitting to the communication client the client SOAP response describing the content of the client operation response read by the server gathering means and the server SOAP request describing the content of the server operation request read by the server

gathering means that are described together in the HTTP response to the HTTP request.

5

83. The communication system as claimed in claim 82, wherein the client transmitting means is arranged to periodically transmit the HTTP request to the communication  
10 server.

15 84. The communication system as claimed in claim 82, further comprising:

client prioritizing means for assigning priority information to the server request stored in the client first storage means and the client request stored in the client  
20 second storage means; wherein

the client response generating means is arranged to successively read the server request from the client first storage means, generate the server operation response to said server request, and store the generated server operation  
25 response in the client first storage means according to the

priority information;

the client gathering means is arranged to successively read the server operation response to the server request from the client first storage means according to the priority  
5 information, and successively read the client request from the client second storage means according to the priority information;

said communication system further comprising:

server prioritizing means for assigning priority  
10 information to the client request stored in the server first storage means and the server request stored in the server second storage means; wherein

the server response generating means is arranged to successively read the client request from the server first  
15 storage means, generate the client operation response to said client request, and store the generated client operation response in the server first storage means according to the priority information; and

the server gathering means is arranged to successively  
20 read the client operation response to the client request from the server first storage means according to the priority information, and successively read the server request from the server second storage means according to the priority information.



85. A communication system control method for controlling  
5 a communication system comprising a communication client and a  
communication server, wherein the communication client  
transmits a communication request to the communication server  
and receives a communication response to said communication  
request from the communication server, said communication  
10 request describing a client request corresponding to a client  
operation request to the communication server, said  
communication response describing a client operation response  
to said client request from the communication server,  
said method controlling the communication client to  
15 execute:  
a transmitting process of collectively transmitting to the  
communication server the client request and an server operation  
response to a server request corresponding to a server  
operation request from the communication server that are  
20 described together in the communication request;  
a receiving process of collectively receiving from the  
communication server the client operation response to the  
client request transmitted to the communication server and the  
server request that are described together in the communication  
25 response to the communication request; and

a process of executing an operation according to the server request and generating the server operation response to the server request as an execution result of said operation; and

5       said method controlling the communication server to execute:

a receiving process of collectively receiving from the communication client the client request and the server operation response to the server request transmitted to the communication client that are described together in the communication request;

a transmitting process of collectively transmitting to the communication client the client operation response to the client request received from the communication client and the server request that are described together in the communication response to the communication request; and

a process of executing an operation according to the client request, and generating the client operation response to the client request as an execution result of said operation.

20

86. The communication system control method as claimed in claim 85, wherein:

25

the client operation request and the server operation request each correspond to a function call; and

the client operation response and the server operation response each correspond to an execution result of a function  
5 called by the function call.

10 87. A communication system control method for controlling a communication system comprising a communication client and a communication server, wherein the communication client transmits a communication request to the communication server and receives a communication response to said communication  
15 request from the communication server, said communication request describing a client request corresponding to a client operation request to the communication server, said communication response describing a client operation response to said client request from the communication server,  
20 said method controlling the communication client to execute:

a process of implementing a first storage area for storing a server request corresponding to a server operation request from the communication server and a server operation response  
25 to said server request;

a process of implementing a second storage area for storing the client request and the client operation response to said client request;

5 a request generating process of generating the client request and storing the generated client request in the second storage area;

a response generating process of reading the server request from the first storage area, executing an operation according to said server request, generating the server  
10 operation response to said server request as an execution result of said operation, and storing in the first storage area the generated server operation response in association with the read server request;

a gathering process of reading the server operation  
15 response to the server request from the first storage area, and reading the client request from the second storage area;

a transmitting process of collectively transmitting to the communication server the read server operation response and client request that are described together in the communication  
20 request;

a receiving process of collectively receiving from the communication server the client operation response to the client request transmitted to the communication server and the server request that are described together in the communication  
25 response to the communication request; and

a distributing process of storing in the first storage area the server request received in the receiving process, and storing in the second storage area the received client operation response to the client request transmitted to the communication server in association with the client request transmitted to the communication server;

said method controlling the communication server to execute:

a process of implementing a first storage area for storing the client request and the client operation response to said client request;

a process of implementing a second storage area for storing the server request and the server operation response to said server request;

a request generating process of generating the server request and storing the generated server request in the second storage area;

a response generating process of reading the client request from the first storage area of said communication server, executing an operation according to said client request, generating the client operation response to said client request as an execution result of said operation, and storing in the first storage area the generated client operation response in association with the read client request;

a receiving process of collectively receiving from the

communication client the client request and the server operation response to the server request transmitted to the communication client that are described together in the communication request;

5           a distributing process of storing in the first storage area the client request received in the receiving process, and storing in the second storage area the received server operation response to the server request transmitted to the communication client in association with the server request  
10 transmitted to the communication client;

          a gathering process of reading the client operation response to the client request from the first storage area of said communication server, and reading the server request from the second storage area of said communication server; and

15           a transmitting process of collectively transmitting to the communication client the read client operation response and server request that are described together in the communication response to the communication request received in the receiving process of said communication server.

20

88. The communication system control method as claimed in  
25 claim 87, wherein the communication client is controlled to

periodically transmit the communication request to the communication server.

5

89. The communication system control method as claimed in claim 87, wherein:

the communication client is controlled to:

10       transmit to the communication server the client operation request and the server operation response as SOAP messages in the transmitting process; and

receive from the communication server the server operation request and the client operation response as SOAP messages in

15 the receiving process; and

the communication server is controlled to:

receive the server operation response and the client operation request from the communication client as SOAP messages in the receiving process; and

20       transmit the client operation response and the server operation request to the communication client as SOAP messages in the transmitting process.

25

90. The communication system control method as claimed in claim 87, wherein

the communication client is further controlled to:

5        execute a process of assigning priority information to the server request stored in the first storage area and the client request stored in the second storage area;

in the response generating process, successively read the server request from the first storage area, generate the server  
10    operation response to said server request, and store the generated server operation response in the first storage area according to the priority information;

in the gathering process, successively read the server operation response to the server request from the first storage  
15    area according to the priority information, and successively read the client request from the second storage area according to the priority information; and

the communication server is controlled to:

execute a process of assigning priority information to the  
20    client request stored in the first storage area and the server request stored in the second storage area;

in the response generating process, successively read the client request from the first storage area, generate the client operation response to said client request, and store the  
25    generated client operation response in the first storage area



according to the priority information; and

in the gathering process, successively read the client  
operation response to the client request from the first storage  
area according to the priority information, and successively  
5 read the server request from the second storage area according  
to the priority information.